MENINGIOMAS WITH DEMENTIA AS THE FIRST AND PRESENTING FEATURE.

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THE purpose of this paper is to call to the attention of neurologists, psychiatrists and neurosurgeons a group of meningiomas with dementia as the earliest and presenting symptom. The diagnosis in these cases is apt to be missed, especially if the patient is in the arteriosclerotic or presenile age-group. This is equally true of other tumours, but the practical importance of early diagnosis of meningiomas is that with the removal of the tumour the patient usually recovers from the mental illness.

A great many patients with brain tumours show mental changes in the form of apathy, inattention, dullness and, in the later stages, drowsiness, stupor and coma as the result of increased intracranial pressure. With the symptoms so caused this paper is not concerned.

The dysphasias, dysgnosias and dyspraxias are in a sense mental disturbances, but are easily distinguished from dementia if the neurological examination is complete.

That dementia may be caused by frontal gliomas is well known (Sachs, 1930). Less well known is the fact that third ventricle tumours (Riddoch, 1936), posterior fossa tumours (Brain, 1931, and Wilson and Rupp, 1946) and temporal lobe tumours (Golla, 1931) may also have dementia as their presenting feature. It is interesting that tumours in these widely separated areas may show both the intellectual impairment and the personality disorder which are the constituents of dementia. Mental symptoms in brain tumour patients have been studied by Davidoff (1930), Sachs (1930), Jefferson (1939), Whitfield (1946), and McIntyre and McIntyre (1942). Busch (1940), in a remarkably thorough paper, analysed the occurrence of mental symptoms in various types of tumours on a histological and topographical basis.

The following 8 cases of meningioma, in which dementia appeared as the initial symptom preceding the development of those commonly regarded as indicative of cerebral tumour, have been collected from the records of Mr. Wylie McKissock of 48 verified meningiomas at the National Hospital (1945–49), and 187 surgically verified meningiomas from the Atkinson Morley Hospital (Mr. Wylie McKissock and Mr. Valentine Logue, 1936–49). This group, therefore, represents the approximate incidence (3·4 per cent.) of this syndrome among 235 intracranial meningiomas. This series is comparable to that of Cushing and Eisenhardt (1938).

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CASE 1.—Mrs. F. G—, aged 64, was admitted to the National Hospital on 12 December, 1949, under the care of Sir Charles Symonds. Her past history and family history were irrelevant. The history had to be obtained from the husband, as the patient was unable to give an account of herself. She said she had many troubles, but could not state them.

Her present illness probably went back two years, during which time she was excessively preoccupied with the ills of her pet dog. For three months she had had episodes of trembling all over, worse in the morning, but these were not associated with any disturbance of consciousness. She became progressively more forgetful and muddled in her mind, and lost all initiative. For three weeks she had been confined to bed and was doubly incontinent, mainly because she appeared to lack the initiative to go to the bathroom, as she was quite able to get about. She became so confused that she was utterly unable to dress herself. She had no headache, no fits and no vomiting. She had a good appetite and slept well.

Physical examination in the out-patient department of the National Hospital was normal except for profound dementia. She could not co-operate for any tests of intelligence. She was disoriented in time and place. Her blood pressure was 160/90. The E.E.G. showed a " gross destructive lesion of the left fronto-temporal region, probably a rapidly growing tumour." The skull X-rays showed marked erosion of the posterior clinoids, indicating increased intracranial pressure. The patient was admitted to the National Hospital, where further clinical examination revealed no more positive neurological signs except a persistent tremor of the extended hands. She lay inert in bed, but was not difficult to rouse. There was no aphasia, apraxia or anosmia. The cranial nerves were all intact, as were the reflexes, except for an equivocal extensor plantar response on the left. There was no weakness of the arms or legs, and sensory examination appeared normal, as far as could be determined from the patient's incoherent responses. X-rays showed that the left foramen spinosum was enlarged. An arteriogram strongly suggested a left, frontal, parasagittal meningioma because of a characteristic " blush." On 1 January, 1950, a 33-gm., left frontal, parasagittal meningioma was removed by Mr. McKissock.

Two months after the operation the patient was up and about, her course having been complicated by a wound breakdown. Her mental state was entirely normal. She recalled little of her pre-operative condition except that she had been distressed over her incontinence. Her tremor had disappeared and her plantar responses were flexor. She felt better than she had for years.

Comment.—This patient had no symptoms of intracranial disease except for her dementia and incontinence. Her neurological examination was repeatedly negative, except for an inconstant and doubtful plantar response, a slight facial weakness and the peculiar tremor. The fact that post-operatively she remembers having been distressed over her incontinence is important. The E.E.G. and X-rays were the only conclusive signs of an expanding lesion, and both of these were more suggestive of a malignant lesion than a benign one. The enlarged foramen spinosum on the left, a sign which we have come to find valuable as suggestive of meningioma, was the only evidence for this type of tumour before the arteriogram.

CASE 2.—Mrs. M. P—, aged 26, was admitted to the National Hospital on 6 October, 1945, under the care of Dr. E. A. Carmichael, with the chief complaint of confusion and lack of memory for several months. Her family history was unobtainable. The past history was irrelevant.

The present illness began several months before admission, with progressive confusion. She found herself unable to change money, and she " made silly mistakes." There was progressive deterioration in memory for recent and remote events. She was quite aware she was failing mentally and was quite worried about it, fearing she was losing her mind. Two weeks before admission she had a severe generalized headache, " like a pressure." During the week before admission there was intermittent vomiting. She had no aphasia, diplopia, disturbance of con-

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sciousness, loss of vision, paresis or tinnitus. Her husband noted nothing wrong with her until two weeks before admission. There was no incontinence.

Examination.—The patient was drowsy, inattentive, slow and forgetful. Memory for recent and remote events was very poor. She could not remember when she was married, or when she came to the hospital. She was unable to co-operate for the simplest intelligence tests. There was no aphasia or apraxia. She had bilateral papilloedema, more on the left than the right. There was a right lower facial weakness of the central type, and a slight weakness of the right arm, which was clumsier than the left. Reflexes on the right were brisker than on the left. The right abdominal reflexes were absent. The right plantar response was equivocal or extensor. There was no sensory defect to gross testing, but co-operation was so limited that careful evaluation was impossible. Plain X-rays of the skull showed some erosion of the posterior clinoids. E.E.G. showed " severe, generalized, slow activity, probably related to pressure." A ventriculogram revealed a " big, posterior, left-sided tumour, probably a glioma."

On 11 October, 1945, a craniotomy was performed by Mr. McKissock. The brain was very tight and tended to herniate through the dural opening. Probing for the tumour with a brain needle " revealed a tumour typical in consistency of a mixed glioma in the fronto-parietal area." It was felt that no useful purpose could be served in extirpating this tumour, and the wound was closed.

The patient died the night of the operation. Autopsy (confined to the head) revealed a large bilobed, fibrous meningioma in the falx between the frontal lobes. It lay about half-way between the frontal poles and the Rolandic fissure. Histologically it was a typical fibrous meningioma. There was severe bilateral tonsillar and uncinate herniation, greater on the left.

Comment.—This patient showed only progressive dementia and worry about losing her mental powers for several months before the classical signs of headache, vomiting and papilloedema appeared. By that time right pyramidal tract signs left no doubt that she had a brain tumour. A meningioma was never suspected pre-operatively, and the operative probing was entirely misleading.

CASE 3.—Mrs. E. T—, aged 63, was admitted to the National Hospital on 15 December, 1948, under the care of Sir Charles Symonds. The patient was unable to give a rational history, hence it was obtained from relatives, and apparently had begun a year before, when her mental faculties began to fail. She lost track of the days of the week, began to repeat herself, and made serious mistakes in judgment and money matters. There were lucid intervals of normal mentality during this time. She had occasional slight frontal headaches. There were no fits, vomiting, weakness, visual disturbances, paraesthesiae or dysphasia. Examination at the National Hospital showed constant plucking, fiddling movements with both hands, marked dementia, and inability to concentrate. When asked questions she frequently became mute, smiled, and was quite inaccessible. She was completely disoriented in time, place and person. There was mild confabulation, slight drowsiness and no co-operation. The fundi were normal. Except for a slight inequality of the pupils, the left being slightly larger than the right, the cranial nerves were normal, as far as could be tested. Motor power was poor because of inadequate co-operation, but there was no paresis. There was bilateral ankle clonus, and both plantar responses were extensor. Sensory examination could not be done, though she responded to pin-prick equally on each side. Skull films showed the pineal pushed way down, but in the midline, though this was not appreciated until post mortem. Pneumo-encephalogram produced no filling of the ventricles. C.S.F. was normal with a protein of 15 mgm. per cent. The patient died of bronchopneumonia on her 14th hospital day, without surgical intervention.

Autopsy revealed a small meningioma, about 15 mm. in diameter, growing forward in the midline from the anterior end of the junction of the tentorium and the falx. It was slightly adherent to the splenium of the corpus callosum. The pineal lay between the splenium and the colliculi, but the latter were not deformed or adherent to it. There was no uncinate herniation, and only slight tonsillar herniation.

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Comment.—This was a very small, low-lying posterior falx meningioma, arising where the inferior longitudinal sinus and the vein of Galen meet to enter the sinus rectus. This is a very rare site for falx meningiomas to arise. A similar case was reported by Balado and Tiscornia (1927). Our case showed massive dementia but no evidence of increased intracranial pressure despite a year's history. A month before her death she showed only a depressed pineal gland, incontinence, tremor and a left plantar extensor response. Headache was not a prominent sign. The plucking, purposeless movements of the hands are interesting, but certainly non-specific in character. Ventriculography should have been done when encephalography did not fill the ventricles. The tumour was small, benign, pedunculated and probably removable.

CASE 4.—Mrs. D. B—,aged 41, was admitted to the Atkinson Morley Hospital on 11 August, 1942, under the care of Mr. McKissock. Her family history was irrelevant. The past history revealed that her right eye had been partially blinded by a hat pin at the age of 15. She had been struck by a golf ball in the left frontal region 18 months previously. The present illness began, roughly, five months before admission, with a vague feeling of tiredness and weakness. She complained of headache during her morning bath, when she often felt faint, and occasionally vomited. She was rather confused, and unable to cite definite incidents. She complained that her memory had become very bad. Recently she had been doing strange things, like getting dressed and going for a walk in the middle of the night. Nothing more than this could be obtained from the patient. She was grossly demented, confused, deteriorated, incontinent and inaccessible. Information from the Stanboroughs Hospital, where she had previously been admitted, told of two periods of " stupor," one lasting four days, and one briefer attack a few days before admission.

Examination.—The patient was intellectually deteriorated, confused, disoriented, and had trouble remembering her own history. Her attention wandered. She was right-handed, and showed no dysphasia or dyspraxia. The cranial nerves were normal except for a slight fullness of the retinal veins and loss of the physiological cup on the left. There was no anosmia. Motor power and tone were entirely normal, as was co-ordination. The reflexes were all equal and active. The abdominal reflexes were present and the plantar responses were flexor. There was no disturbance of sensation. Her blood-pressure was 100/80. Skull films showed " a ring of venous channels in the right frontal region in the centre of which is a bony enostosis extending backwards on the roof of the orbit and down to the cribriform plate. There is some erosion of the clinoids. The right foramen spinosum is larger than the left. This suggests a right frontal meningioma."

On 17 July, 1942, a ventriculogram revealed a right frontal neoplasm, and on the same day Mr. McKissock removed most of an exceedingly vascular meningioma arising from the posterior part of the right frontal sinus. The operation was discontinued before the hyperostosed portion of the roof of the orbit could be removed. The patient recovered perfectly from this difficult first-stage operation, and two months later a second-stage operation was done, removing the bony hyperostosis. She was discharged three weeks after this procedure, feeling perfectly well and with no abnormal physical signs. She was last seen on 25 April, 1949, almost seven years after operation, at which time she looked and felt well. Her neurological examination was normal. She had recently won a local golf championship.

Comment.—This was a pre-olfactory anterior basal meningioma, and presented with symptoms of dementia, confusion, disorientation and inaccessibility. She had no anosmia, which only about half the patients with olfactory groove meningiomas have—a sign which is easily missed in a confused patient who cannot co-operate for a sensory examination. There were no pyramidal

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tract signs. There was minimal fullness of the retinal veins, and loss of physiological cupping, and it was the astuteness of the radiologist which first suggested the diagnosis. Here again the foramen spinosum was enlarged.

CASE 5.—Mr. F. G—, aged 67, was seen in consultation by Mr. Valentine Logue, at the request of Dr. Bond, at the Royal United Hospital, Bath, on 3 November, 1944. This history was obtained from his wife. He had been perfectly well until nine months previously, when there was an insidious onset of a quiet, vacant manner, and his memory began to deteriorate. This was associated with vague headache. He worked as a stone-mason until four months previously. He had general malaise, and his vacant manner increased. He took to his bed, and had not been out of it since. He deteriorated rapidly, and had to be attended by a nurse; he became childish, was occasionally doubly incontinent and unable to feed himself. One month previously a small lump was found on his head, to which little attention was paid. He was presumed to be suffering from arteriosclerotic dementia, similar to an illness of his brother, who had had paralysis agitans.

Examination.—He was completely disoriented in time and space, grossly demented and difficult to examine. He tended to fall asleep during the interview. There was no power of concentration and no co-operation for the simplest mental testing. He was left handed. There was no aphasia, agnosia or apraxia. His general condition was poor; he was wasted and dehydrated; his neck was stiff; there was a non-tender swelling, 5 cm. in diameter, to the left of the vertex. There was a slight left facial weakness, but otherwise his cranial nerves were normal. There was no anosmia, and the fundi were normal. There was a spastic quadriparesis, greater on the left, although his tendon reflexes were greater on the right in the arms and legs. The right plantar response was extensor, the left equivocal.

Skull films showed the clinoids to be rarified. There was no bony density corresponding to the lump at the vertex, though two large vessesl ran up to this area. A meningioma was suspected. Ventriculogram and craniotomy were performed on the same day, and a 91-gm. parasagittal meningioma was removed by Mr. Logue. The superior longitudinal sinus was not involved. The bone flap was invaded by tumour and had to be sacrificed. After an initially good recovery he suddenly died three weeks post-operatively. Autopsy was not permitted.

Comment.—This patient presented symptoms of such gross dementia, deterioration and childishness that his slight headaches and the lump on his head were not appreciated. His spastic quadriparesis was more suggestive of a spinal cord lesion that cerebral tumour. Skull films gave the most suggestive hint as to the diagnosis of a parasagittal meningioma.

CASE 6.—Mrs. E. J—, aged 57, was admitted to the Atkinson Morley Hospital, Wimbledon, under the care of Mr. Logue, on 22 March, 1948. The history was obtained from her husband. The family history and past history were irrelevant. About three months before admission she changed in behaviour. She lost interest in her home and herself. She didn't wash, became very sloppy, and showed marked mental deterioration. She was muddled, confused, incontinent and obviously demented. It was incidentally mentioned she had lost her sense of smell two years before. There were no headaches, fits or vomiting.

Examination.—The patient was markedly demented. She could not co-operate for the simplest intelligence tests. Her mood was one of depression. There was considerable loss of affect, and her behaviour was inappropriate to the situation. The skull was normal. She was recorded as showing "no anosmia." There was early papilloedema, and a slight left facial weakness. There was no abnormality of strength, tone or co-ordination in the arms or legs. The abdominal reflexes were absent; the plantar responses were flexor. Sensory examination was impossible. The E.E.G. showed a diffuse, unlocalized abnormality.

On 1 April, 1948, a ventriculogram showed a gross filling defect of both frontal horns as far back as the foramen of Monro, and on the same day Mr. Logue removed a huge olfactory groove meningioma extending from the back of the right frontal sinus to the sella, and along the sphenoid ridge on the right to the pterion. The part on the right was removed as a first-stage procedure, and three weeks later an

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equally large extension was removed from the left anterior fossa. She recovered extremely well, was up and about on her 14th post-operative day and was improving mentally. Three and a half weeks after operation she had a sudden pain in the chest and died of a pulmonary embolism. Autopsy revealed its source in the right saphenous vein. The brain showed no residual tumour.

Comment.—This patient showed such overwhelming dementia that her history of anosmia was not appreciated and, in fact, it was not confirmed by examination in her demented state. She showed only early papilloedema, incontinence and a slight facial weakness. The E.E.G. was helpful in showing a diffuse, though unlocalized abnormality, whereas the skull films were negative.

CASE 7.—Mr. F. W—, aged 67, was admitted to the National Hospital, under the care of Sir Charles Symonds, on 30 March, 1949. He was a retired headmaster of a school and was well known for his intellect. His chief complaints were inertia, loss of self-respect and uncleanliness for six months. Visual hallucinations had been present for three months. He refused to give his family history or past history. He was in good health until six months before admission, when his attitude toward life changed. He didn't want to get up in the morning, which he regarded as a nuisance, because he would have liked to go for a walk, but he was " just too lazy." He didn't wash, shave, or dress himself. He wouldn't eat until stupid whims were satisfied. He changed from a considerate man to being very inconsiderate of his ill wife, on whom he put undue hardship. He was unconcerned about this. He became irritable and intolerant. For six months his visual acuity had been failing, especially in his left eye, which had been the stronger eye. For three months he had visual hallucinations occurring in any part of his visual field appearing as flowers or dogs' heads, and lasting from the time he went to bed until he went to sleep. He denied any real headache. For the last year there had been shortness of breath when climbing stairs. He had not been incontinent until he entered the hospital, when he wet the bed the first two nights " because he was too lazy to get up." He considered anyone a fool who was not incontinent ! There were no fits or diplopia. He thought his memory was good. His son thought the chief change was in his negativism, stubborness and lack of consideration. He refused to take a bath, but when finally forced to, refused to get out.

Examination.—He was stubborn and negativistic on the ward and frequently incontinent. He could discuss world affairs apparently intelligently on a high plane, but with no judgment or insight, and with complete intolerance. It was difficult to hold his attention, as he was euphoric and overactive. Intelligence tests showed some uneven falling off from what was obviously a superior level previously. There was no dysphasia, dyspraxia or agnosia. He did the 100–7 test in two and a half minutes with three errors. He was totally unable to do any of the similarity or proverb tests. There was bilateral anosmia. Visual acuity was down to 6/36 on the right and 6/24 on the left. The fundi were normal. The rest of the cranial nerves were normal except for slight bilateral deafness of long standing. Examination of his motor system, sensory system and reflexes showed them to be entirely normal. His blood-pressure was 160/90. He was thought at first to be suffering from presenile dementia of the Pick's variety, until his C.S.F. protein was discovered to be 130 mgm. per cent. Together with his anosmia, this strongly suggested a tumour. X-rays were reported as negative. The E.E.G. showed a left frontal lobe focus of abnormal activity.

Ventriculography on 11 March, 1949, revealed both anterior horns of the ventricles pushed up and back, and the same day Mr. McKissock removed a large olfactory groove meningioma after amputation of the left frontal pole. It extended under the falx for a short distance and compressed the right frontal lobe. The patient recovered well after a period of initial confusion, incontinence and lack of initiative. On re-examination of his plain skull films in retrospect, there was some sclerosis of the olfactory groove and calcification behind the frontal sinus.

He was last seen on 16 January, 1950, eight months after operation, feeling perfectly well. His mental state was normal except for possible slight euphoria, and he complained of momentary episodes of forgetting what he wanted to say.

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Comment.—Like Case 6, the deterioration of this elderly man was compatible with an arteriosclerotic dementia, or with Pick's disease. He showed no pressure signs. Except for the anosmia and the high C.S.F. protein this diagnosis could have been missed, and the patient might have ended up in a mental hospital. The E.E.G. was very helpful in this instance, and the X-ray was positive, although the abnormalities were not appreciated before operation.

CASE 8.—Miss H. L—, aged 69, was admitted to the National Hospital on 27 October, 1948, under the care of Dr. S. P. Meadows, because of depression of six months' duration. Her family history and past history were irrelevant. The patient was unable to give any history herself. The account was obtained from a sister and the family doctor. One year before, she underwent a personality change, becoming more querulous, hypochondriacal and aggressive than was normal for her. Six months previously she became severely depressed, but this was not constant. She became very weepy, self-reproachful, and gradually deteriorated mentally. Her housework fell off in efficiency, and she lost interest in her appearance. Six weeks previously her table manners became careless and sloppy, and she stuffed food into her mouth with both hands. She ate ravenously and almost anything. She became confused and had trouble dressing herself properly, getting " lost in her clothes." For three weeks she had been incontinent of urine, being upset and ashamed of it. For this length of time she had had attacks of headache. For one week she was apathetic.

Examination.—She was semi-comatose but could be roused. She was completely unco-operative. After magnesium sulphate enemata she improved, but still could give no history or reliable responses on sensory examination. She was not aphasic, but her speech was inappropriate. She was unable to co-operate for any simple intelligence tests. She had a curious disinclination to move her left limbs. She was right-handed. There was slight bilateral papilloedema and a marked left lower facial weakness. There was slight increase in tone in the left arm, but no weakness. Extension of the left arm could not be maintained against gravity. Reflexes in the arms were greater on the left than the right. The plantar responses were flexor. No sensory findings could be relied upon because of her confusion.

Skull X-rays showed pressure changes in the posterior clinoids, and the pineal gland was shifted to the left. The E.E.G. was grossly abnormal, suggesting a space-occupying lesion in the right temporo-parietal region. The C.S.F. was not examined.

A ventriculogram revealed a large right parietal convexity neoplasm. Needle biopsy was done and a glioma was suspected, but the permanent sections revealed a meningioma. Right percutaneous arteriography revealed a " blush " in the phlebograms, suggesting a right parietal parasagittal meningioma. On 25 November, 1948, Mr. McKissock removed a large meningioma from this area. Her post-operative course was complicated by a spinal-fluid fistula requiring a secondary operation and re-suture. She was eventually discharged 13 January, 1949, in excellent condition, normal mentally and negative neurologically. She was last seen 4 July, 1949, six months after operation, with no complaints and a normal examination.

Comment.—The slowly progressive dementia in this elderly woman was thought to be senility for a year before her tumour was recognized. Fortunately the mental changes were reversible. The headache, papilloedema, incontinence, facial weakness, pyramidal tract signs and parietal lobe symptoms, in addition to positive X-rays and E.E.G., were all available to make the diagnosis, though overshadowed by the dementia.

DISCUSSION

Dementia as the presenting or earliest symptom of meningiomas has not been emphasized previously. Cushing and Eisenhardt (1938), in their classic

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study of meningiomas, list mental changes as an infrequent presenting complaint, even of the olfactory groove tumours. Of their 29 tumours in this region, they state, "In six instances personality changes were inaugural." Of their total of 295 intracranial meningiomas, probably only 12 showed dementia as the first symptom.

Henderson (1938) stated that mental changes were uncommon before the terminal stages of blindness in cases of anterior basal meningiomas. Our cases do not corroborate this. Busch (1940), however, stated that mental changes may long precede other symptoms in anterior fossa meningiomas. McIntyre and McIntyre (1942), in a psychiatric paper which is refreshing in its "brain tumour consciousness," reported four meningiomas among seven cases of brain tumour with primarily psychiatric symptomatology. Davidoff (1930), Sachs (1931), Jefferson (1939), Rylander (1939), Wilson and Rupp (1946) and Whitfield (1946) have reported cases of meningioma whose symptoms were virtually of dementia only.

Of these eight cases, six were women and two were men. Six were in the

Case.	Sex.	Age.	Site.	Length of history.	Head-ache.	Vomit-ing.	Papill-oedema.	Anos-mia.	In-conti-nence.	Tremor.	Visual symp-toms.
1. F. G—	♀	64	L. para-sagittal	5/12	o	o	o	o	+	+	o
2. M. P—	♀	26	Anterior falx	3–4/12	+	Occasional	+	—	o	o	o
3. E. T—	♀	63	Posterior falx	12/12	Slight	o	o	—	+	+	o
4. D. B—	♀	41	Pre-olfactory	5/12	Slight	Occasional	Slight	o	o	o	o
5. F. G—	♂	67	R. para-sagittal	9/12	Slight	o	o	o	+	o	o
6. E. J—	♀	57	R. and L. olfactory groove	3/12	o	o	+	+	+	o	o
7. F. W—	♂	67	L. olfactory groove	6/12	o	o	o	+	+	o	+
8. H. L—	♀	69	R. parietal parasagittal	12/12	Slight	o	+	o	+	o	o

Case.	Facial.	Pyra-midal signs.	Sen-sory.	Plain X-ray.	E.E.G.	Arte-rio-graphy.	C.S.F.	Clinical diagnosis.	Exos-tosis.	Result.
1. F. G—	+	+	o	+	+	+	o	Bi-frontal glioma	o	Operation. Improving 2/12.
2. M. P—	+	+	o	+	+	—	o	Inoperable glioma	o	Biopsy. Died.
3. E. T—	o	+	o	+	o	—	T.P. 15	? B.T.	o	Died without operation.
4. D. B—	o	o	o	+	o	—	I.P. 120 T.P. 30	? B.T. ? Menin-gioma.	o	Two operations. Well seven years later.
5. F. G—	+	+	o	+	—	—	—	A–S dementia.	+	Died three weeks after operation.
6. E. J—	+	o	o	o	+	—	I.P. 240 T.P. 25	? Olfactory groove	o	Died. Pulmonary embolus.
7. F. W—	o	o	o	+	+	—	+	Pick's disease	o	Operation. Improving 6/12.
8. H. L—	+	+	o	+	+	+	—	A–S dementia	o	Operation with recovery at 6/12.

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latter period of life, a fact which made the diagnosis of presenile dementia more probable. Six of the tumours were frontal, one in the posterior one-third of the falx in the pineal region, and one parietal parasagittal. The accompanying table shows well how few were the localizing signs and symptoms in these demented patients. Obviously the frontally situated tumours are most likely to give rise to mental symptoms. The fact that dementia may occur with lesions situated elsewhere is important.

Jefferson (1939) stated that 90 per cent. of his frontal meningiomas had "pressure signs." It should be brought out here that the triad of "headache, vomiting and papilloedema," thought to be the usual hallmark of brain tumour, is a manifestation of far-advanced disease, wherein the risks of operation are greatest for the patient, and the task for the surgeon most trying. Two of these patients showed the triad by the time they came to the hospital, but two others showed none of the triad. Four of the eight had no papilloedema. Only one complained of severe headaches, and four others had slight headaches. Two of the three olfactory groove tumour cases showed anosmia. This may be an invaluable sign if the responses of the demented patient can be relied upon. It was present in only 14 of Cushing and Eisenhardt's 29 olfactory groove tumours, and was a chief complaint in only three.

Six of these eight cases were incontinent of urine or faeces, or both. This is a well-known symptom in frontal neoplasms. It has been studied particularly by Langworthy (1936) and Watts and Uhle (1935). Its transitory occurrence after frontal leucotomy is quite constant. The fact that two of these cases admitted distress over their inability to hold their urine is an important point in favour of the thesis that this form of incontinence is due to disturbance of a cortical representation of the bladder, rather than a mere disregard for their personal cleanliness.

Tremor was present in two cases. So-called "frontal tremor" is another interesting phenomenon, the cause of which is unknown. It was characterized in these cases by rather coarse, regular, alternating movements of the extended arms involving the entire limb. It is probably of no localizing value, but may be a suggestive sign at least of organic disease. The studies of Critchley (1930) on thrombosis of Heubner's artery, and more recently those of Smyth (1941) who found pathological cell changes in the contralateral dentate nucleus of four patients with frontal lobe lesions who had tremor or ataxia, are of interest in this respect.

In five cases some minimal pyramidal tract signs were present.

A slight lower facial weakness was present in five cases. Sachs (1930) found this in 32 of 45 space-occupying lesions of the frontal lobes. It is valuable when present, but obviously not invariable.

The plain X-rays of the skull in seven of the cases indicated an intracranial tumour, although the changes were not gross and consisted of rarified clinoids, a shifted pineal, abnormal density or vascular channels in the bone.

The EEG suggested a space-occupying lesion in five cases, in one of which the skull films were negative. The spinal fluid was helpful in one case only. The pre-operative clinical diagnosis was meningioma in only two cases.

In every-day neurological and psychiatric practice one meets frequently with

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the problem of diagnosis of the demented patient. The commonest causes are probably arteriosclerotic cerebro-vascular disease, tumour, Pick's disease and dementia paralytica. Minimal signs may be present in the cases with arteriosclerosis or Pick's disease, as well as in the cases with brain tumours. The diagnosis can be established in these cases by full investigation only, and, in a certain proportion, the lesion may be a benign, removable tumour. Three to four per cent. of all meningiomas may have this syndrome as their presenting feature. It must not be assumed that demented patients with minimal signs have degenerative conditions or malignant inoperable tumours, as they may harbour a curable meningioma.

Conclusions.

1. A significant proportion of meningiomas in various locations have dementia as the earliest and presenting feature.

2. Eight such cases are reported and analysed.

3. Careful, complete neurological examinations in demented patients must be done, in conjunction with accessory methods of examination, to bring the curable tumour cases to the neurosurgeon.

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